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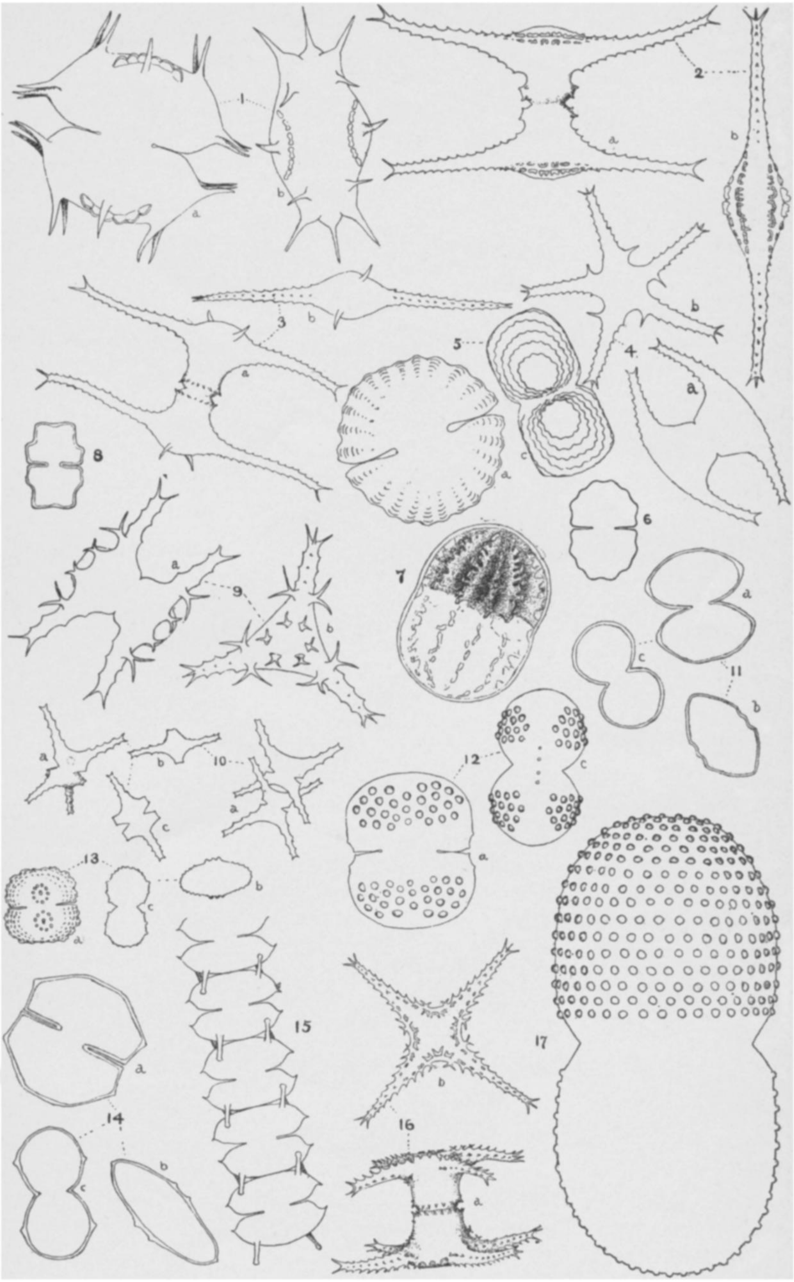

NEW AND RARE DESMIDS.

of the anatomy of the species of Empetraceæ with the typical Ericaceæ would be an interesting study, and this we hope to accomplish.

Explanation of Plate 210.

FIG. I. Leaf of *C. alba*, lower surface. a. Groove.

FIG. II. Leaf of *C. Conradii*, lower surface. a. Groove.

FIG. III. Outline of cross-section of leaf of *C. alba*.

FIG. IV. Outline of cross-section of leaf of *C. Conradii*.

FIG. V. Portion of a cross-section of a mature leaf of *C. alba*. a. Thickened cuticle. b. Lumen of the large epidermal cells. c. Thickenings of the cellulose wall of epidermal cells. e. Raised stomata on lower surface. f. Simple hairs. g. Glands.

FIG. VI. Portion of cross-section of a mature leaf of *C. Conradii*. a. Thickened cuticle. b, b. Lumen of epidermal cells. c, c. Thickenings of cellulose wall of epidermal cells. d. Midrib. e. Raised stomata. f. Simple hairs. g. Capitate glands.

FIG. VII. Cross-section of stem of *C. alba* one year old. a. Epidermis. b. Rind parenchyma. c. Endodermis.

Some New and Rare Desmids of the United States.—I.

BY L. N. JOHNSON.

(PLATE 211.)

During the last two or three years the writer has examined quantities of material rich in Desmids from various parts of the country. Among the species noted are some rarities, while a few are apparently unrecorded from the United States, and several are undescribed. It is not my purpose here to give complete lists of all species found, but merely to mention some of the most interesting "finds." The Connecticut specimens mentioned, unless otherwise stated below, were collected at Bridgeport, those from New York at Cold Spring Harbor and the Michigan material at New Baltimore. Curiously enough in these gatherings some of the species recorded by Wolle as common have proved very rare, or have not been seen at all. For example, *Tetmemorus Brebissonii* (Menegh.) Ralfs. has been found but once, and then but a single specimen at Waverly, Mass. On the other hand, some so-called rare species have proved rather abundant, at least in certain localities.

Of the filamentous forms the most interesting were *Onychonema filiforme* (Ehrenb.) Roy and Bissett, and *O. leve* Nordst. at Bridgeport, and *O. leve*, var. *micracanthum* Nordst. from Michigan. The spines of the last named were often not so large as shown in the drawing (Fig. 15). *Hyalotheca undulata* Nordst. was found (Conn.) having a diameter of about 7 μ and with the sheath inconspicuous if present. It thus resembles the type more closely than Wolle's description.

Sphærozosma pulchellum (Arch.) Rab. is frequent in Connecticut, as is another species, undoubtedly *S. Wallichii* Jacobsen. It agrees well with Wallich's description and figures* of *S. excavatum* var. β. It was very abundant last season in the locality mentioned, and across the Sound in New York, and was also found in Michigan. Dimensions, length 12–14 μ, diameter 10–12 μ.

Spirotænia obscura Ralfs. was found near Oyster Bay, N. Y., in 1893. The specimens were in fine condition, and averaged 25 μ in diameter, thus being of about the same size as European specimens. Wolle gives the diameter 8–15 μ.

Of *Closterium* the most noteworthy species collected are *Cl. lineatum* Ehrb. var. *costatum* Wolle (Conn.), *Cl. didymotocum* Corda (Conn.), and *Cl. malmvernianum* DeNot (Mich.). The second agrees perfectly with descriptions and figures of the species named, but the diameter of the cells is 45–52 μ Delponte figures it from Italy of similar form and size. The last may be *Cl. Ehrenbergii* Menegh. var. *brasiliense* Nordst., for there seems little difference between the two forms. The membrane is finely striate, diameter of cell 92 μ, and length eight times as great. It has not before been reported from the United States.

My specimens of *Euastrum gemmatum* Breb., do not resemble Wolle's figures very closely, but are much like those of Ralfs. It is common in Connecticut material.

Euastrum binale Ralfs. var. *insulare* Wittr., of the form shown in Fig. 8, is quite common in Michigan and Connecticut material.

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* Annals and Mag. of Nat. Hist., Ser. 3, 5: 192, *pl. VII., fig. 15* (1860).

E. pinnatum Ralfs, I have from Florida, Connecticut and New York.

At Cold Spring Harbor, N. Y., a number of species of *Micrasterias* were abundant last summer, the most noteworthy being *M. foliacea* Bail. (sometimes in filaments of a hundred cells), *M. papillifera* Breb., and *M. muricata* (Bailey) Ralfs. *M. furcata* Ag. was also common and extremely variable, as shown elsewhere.*

Of *Cosmarium* many interesting forms have been found. The following deserve mention:

C. anisochondrum Nordst. (Mich.).

C. Boeckii Wittr. (Conn.).

C. calcareum Wittr. (Mich.), Fig. 13. This agrees well with Wittrock's description and figures,† except that the larger granules, nine or ten in number, are often arranged in an ellipse with two partly fused ones in the center. Dimensions: length 18–20 μ; diameter 18 μ.

C. cyclicum Lund. (Ann Arbor, Mich.), Fig. 5.

C. impressulum Elfv. (Mich.), Fig. 6. This has probably been passed over as one of the forms of *C. Meneghinii* Breb. It is quite common.

C. monomazum Lund. var. *polymazum* Nordst. (Edgemoor, Ind.).

C. protractum Arch. (Evanston, Ill., and Waverly, Mass.).

C. Quasillus Lund. (Ann Arbor and Northfield, Mich.).

C. subglobosum Nordst. (N. Y.), Fig. 7. This agrees well with Nordstedt's figures and description,‡ except in the relatively short cells. The dimensions given in the original description were, length 37–48 μ, diameter 24–40 μ, while in these specimens they are, length 33–36 μ, diameter 26–28 μ.

C. subspeciosum Nordst. (Mich).

C. sulcatum Nordst. (Mich. and Conn.), Fig. 11. The specimens were quite abundant and were typical. Dimensions: length, 38 μ; diam., 30 μ; isth., 8 μ.

C. suprospeciosum Wolle (Ann Arbor. Mich).

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* Botanical Gazette, 19: 56, *pl. 6* (Feb., 1894).

† Om Gotlands och Ölands Sötvattens-alger, 58, *pl. 4*, *fig. 13* (1872).

‡ De algis aquae dulcis et de characeis ex insulis Sandvicensibus a Sv. Berggren, 1875, reportatis, p. 14, *pl. 1*, *fig. 13* (1878).

C. tenue Arch. (common almost everywhere). Often found in quantity and usually with zygospores. I believe it is the form described and figured by Wolle as *C. bioculatum* Breb. It cannot be that species, for it has smooth zygospores (see Wolle's figure, Desmids of the U. S., Pl. XVIII., Fig. 22).

C. triplicatum Wolle (Conn. and Ann Arbor, Mich).

C. tessellatum (Delp.) Nordst. (Ann Arbor, Mich.), Fig. 17. This is one of the most interesting species found. Only a single specimen was found, but that was in fine condition and agreed exactly with Delponte's figures and measurements. This specimen measured 68 x 140 μ. It has not before been found here.

In addition to this species the following are new to the United States.

C. calcareum Wittr., *C. cyclicum* Lund., *C. subglobosum*, Nordst.

C. subspeciosum Nordst., *C. sulcatum* Nordst. It is interesting to note that of the new species described by Nordstedt from the Sandwich Islands, three have now been found in this country. They are *C. anisochondrum*, *C. sulglobosum* and *C. sulcatum*.

Staurastrum aspinosum Wolle was found abundantly in Connecticut and New York. Other interesting species are:

St. megacanthum Lund. (Conn.). Quite rare.

St. cuspidatum Breb. (Conn.). Only occasionally seen.

St. Hystrix Ralfs. (N. Y.). Scarce.

St. incisum Wolle (Edgemoor, Ind., Conn., and Ann Arbor, Mich.). My determination of this was confirmed by Mr. Wolle. Specimens have several times been found with one semi-cell typical and the other exactly like *St. crenulatum* (Naeg.) Delp.

St. irregulare West (Conn., N. Y.), Fig. 10. I refer here a small species which I have had under observation for several years. Since the plate for this paper was prepared this species has been described by W. West in the Journal of the Royal Micr. Society for 1894. I have not yet seen the paper, but through the kindness of Prof. Nordstedt have received tracings of the figures. The American specimens average 18–20 μ in diameter (with the rays), and 20–25 μ in length; isthmus 6 μ.

St. leptocladum Nordst. (N. Y. and Ann Arbor, Mich.), Fig. 2. The specimens are not exactly like Nordstedt's figures.‖ The base of the semi-cells is shorter, and on the end there is a double row of large divided granules along each side. The differences do not seem great enough to justify separation as a species or even as a variety.

‖ Desmidiae Brasiliae. Aftryk af vidensk. Medd. fra den Naturh. Forening i Kbhvn., p. 218, *Pl. 4*, *Fig. 57* (1869).

St. leptocladum Nordst. var. *cornutum* Wille (Conn.) Fig. 3. The semi-cells show a row of short downward-pointing spines around the base; otherwise the specimens are like the original figures.

St. Ophiura Lund. (N. Y. and Conn.). Frequent. Most of the specimens have but five or six rays, though a few show seven or eight.

St. quadrispinatum Turn. (Edgemoor, Ind.).

St. Ravenelii Wood (Northfield, Mich.). The specimens do not show such an irregularity of the spines as mentioned by Wolle.

Xanthidium cristatum Breb. and *X. fasciculatum* Ehrenb. have been frequently found, but by far the most common form is that shown in Fig. 1. It is probably a form of *X. antilopæum* (Breb.) Kutz, var. *Minneapoliense* Wolle, but the spine on the side of the cell arises invariably *below* the row of granules. Moreover, there is a fifth spine on each end of the cell, nearly between the lower pair. In rare cases this is short or lacking. Prof. Nordstedt has figured ¶ a cell of *X. antilopæum* (Breb.) Kutz, var. *polymazum* Nordst, one semi-cell of which shows this extra spine as a short stub. As the species seems so variable, it is hardly advisable to give a special name to this form, which doubtless runs into the others.

Besides the above named Desmids several new species have been found, and descriptions of them are here given.

Cosmarium nudiceps n. sp., Fig. 12. Length of cell 1⅓ times its breadth. Sinus deep, nearly linear. Semi-cells almost semicircular, with two granules, one above the other at the base, and often traces of one or more above. On the side of the semi-cell and within the margin, nine diverging rows of large granules, the middle, with the first and third on each side, of three; the second of four and the outer of two. In vertical view elliptic with a band through the center bare, and the granules on each side. Length, 48–50 μ; diameter, 36–40 μ; thickness, 25 μ; isthmus, 12–14 μ.

Type in Herb. Johnson, 214. New Baltimore, Mich.

¶ Bidrag till Kännedomen om sydligare Norges Desmidiéer, *pl. 1, fig. 20* (1873).

This seems nearest *C. trinodulum* Nordst. (De Alg. et Char. 1: *pl. 1, fig. 4*), but differs in its larger size and the different arrangement of the granules.

Cos. angulare n. sp., Fig. 14. Length and breadth nearly equal. Sinus deep, linear. Semi-cells unequally hexagonal, with all the angles but those at the apex thickened or even slightly papillate. Sides diverging slightly from the basal angles to near middle of semi-cell, then sloping strongly to the truncate ends. In vertical view narrowly elliptical, with two papillæ near the middle and a smaller one at each end. Viewed from the side circular with a papilla on each side. Length 30–32 μ; diameter 26–30 μ; thickness 12 μ; isthmus 8–10 μ. Type in Herb. Johnson, 280. New Baltimore, Mich.

Staurastrum gyrans n. sp., Fig. 4. Length one-half the breadth. Semi-cells subcuneate, top slightly convex; angles prolonged into slender, slightly incurved rays. Margins of rays serrate-dentate, apices bearing each three short spines. In vertical view 5-radiate; at the base of each ray, on the left side, a strong horizontal spine. Length 20–25 μ; diameter with rays 40–48 μ, without rays 12 μ. Type in Herb. Johnson, 239. Cold Spring Harbor, N. Y.

St. bicoronatum n. sp., Fig. 9. Breadth greater than length. Semi-cells subhexagonal, top somewhat rounded; angles prolonged, each into a ray with three or four serrations, and apex trifid. At base of each ray on the upper side a stout forked spine. Above and between these two smaller ones below the end of the semi-cell. In vertical view triangular, the angles prolonged into serrate rays; two forked spines projecting beyond the margin on each side, with six smaller ones within the margin, forming a circle around the center. Length 14–16 μ; diameter (including rays) 22–25 μ; isthmus 6 μ. Type in Herb. Johnson, 221. Bridgeport, Conn.

In form this is somewhat like *St. proboscideum* (Breb.) Arch. forma *Javanica* Nordst. (De Alg. et Char. 1: p. 11, *pl. 1, fig. 19*,) but it is much smaller, and the processes are not truncate, but strongly bifurcate.

St. elegantissimum n. sp., Fig. 16. Breadth much greater than length. Semi-cells nearly square. Constriction shallow. Base of semi-cell armed with a row of short spines, sometimes with traces of a second; angles prolonged into slender slightly incurved rays armed with three spines at apex. Rays armed above and on each side with a row of sharp spiny teeth, several nearest the base bifurcate. In vertical view 4-radiate; within the margin on each side a row of several incurved bifurcate teeth, the two rows on opposite sides of the ray uniting into a median one near the middle of the ray. Length, 36–38 μ; diameter with rays, 68–72 μ; without, 16–18 μ; isthmus, 12 μ.

Type in Herb. Johnson, 276. Bridgeport, Conn.

A single specimen was found having five rays on one end of the semi-cell. All the others were typical.

BOTANICAL LABORATORY, UNIVERSITY OF MICHIGAN.

Explanation of Plate 211.

(Reduced one-fourth in photographing.)

a, front view of cell; b, vertical view; c, side view.

1. Xanthidium antilopasum (Breb.) Kutz., var. Minneapoliense Wolle, forma. ×560.
2. Staurastrum leptocladum Nordst. ×560.
3. " " var. cornutum Wille. ×560.
4. St. gyrans n. sp. ×770.
5. Cosmarium cyclicum Lund. ×560.
6. C. impressulum Elfv. ×770.
7. C. subglobosum Nordst. ×770.
8. Euastrum binale Ralfs. var. insulare Wittr. ×770.
9. St. bicoronatum n. sp. ×1150.
10. St. irregulare West. ×1150.
11. C. sulcatum Nordst. ×560.
12. C. nudiceps n. sp. ×560.
13. C. calcareum Wittr. ×770.
14. C. angulare n. sp. ×770.
15. Onychonema leve var. micracanthum Nordst. ×770.
16. St. elegantissimum n. sp. ×560.
17. C. tessellatum (Delp.) Nordst. ×560.

Recent Discoveries of Cycadean Trunks in the Potomac Formation of Maryland.

BY LESTER F. WARD.

Scarcely any fact is better known to palæontologists than that of the discovery by Philip T. Tyson, in 1859, of two large cycadean trunks and some other fragments in the iron ore region of Maryland. These were not described at the time, and were only briefly mentioned in his first report as State Agricultural Chemist, published in January, 1860 (p. 42), where he refers to